

calm-weather spout, the base of which came to within 8 feet of the sea surface. From its circular orifice issued a violent stream of wind, to quote, "which made a hollow of about 6 feet diameter in the surface of the water." Doctor Fassig (10) mentions the instance of a vessel which collided with and went through the center of a waterspout. During the passage several objects on deck were drawn upward, among them the captain's log, which went vertically into the air for 40 feet, or the entire length of the attached line.

The mound, or depression.—Within the base of the spout a mound of water has often been reported as observed rising to a height of two or more feet. This can be conceived of as caused by a forcing up of the sea water by reason of the lowered pressure within the spout wall, or by the violence of the winds; or the impression of rising water may be illusory, which is doubtful, considering the number of observations reporting it. Almost as frequently a basinlike depression has been mentioned, as though the water had been hollowed by rotary action, or by a violent descending air current, similar to the one already referred to in the preceding paragraph. While this depression sometimes apparently has been noticed in fully developed thin-walled spouts, yet it

has been plainly seen on a few occasions in surface whirls that have passed in close proximity to vessels.

The cascade.—Similar to the debris-laden ground squall surrounding the foot of a tornado is the cascade, bush, or "bonfire," as it is sometimes called, enveloping the base of a waterspout. This is composed of dense vapor and spray hurled upward and outward from the agitated region, sometimes to the height of 100 feet or more.

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THE COLORADO RIVER SITUATION

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The student of meteorology can hardly let his interest in precipitation cease with the fall of moisture to the ground. He must care something what becomes of it, what it does and what is done with it on its way back toward to sea. So we find the Weather Bureau studying streams and rivers. The forecasting of stream stages, especially at time of flood, is hardly less important than forecasting the weather. Interest extends to stream flow for the purposes of navigation, for power development, and, in arid regions, for irrigation.

The Colorado River has long been one of the streams in which the Weather Bureau has taken an interest. Its flood problems are complex and serious. Its possibilities for power development are tremendous. Its use for irrigation is very important. Its waters are so greatly desired in "the land of little rain" that great cities will lift them over a massive mountain range to supply their needs.

It is not to be expected that the development of a river in which seven States are directly interested can be accomplished without battles over conflicting rights. The past eight years have seen such battles waged over the waters of the Colorado. And the war is not yet ended. The following paper is an attempt to discuss, as fairly as one man may see them, the essential facts of the present situation as regards flood control and use of the waters of the Colorado River.

The Colorado River is a resource of tremendous importance not only in the Southwest but to the whole Nation. It is estimated that development in the lower basin alone, from hydroelectric power, from reclamation of desert land by irrigation and from growth of cities made possible, may well represent a potential wealth of \$14,000,000,000. It is a big proposition. To get the utmost from it there is need of a carefully worked-out plan of development. It is already bringing up questions of national policy that are of the utmost importance. National and State rights are involved. Care must be taken that injustice does not creep in. So far nothing has been done that will interfere with the carrying out of a carefully-con-

sidered, well-ordered plan to make the most of what the river can give.

The base of the situation is, of course, the river. It is not one of the great rivers of the world or even of the United States. It carries no commerce. Its average annual discharge of some 17,000,000 acre-feet of muddy water is barely 2 per cent of what the Mississippi can boast. The flow of the Nile is four times as great. The importance of the Colorado River lies in the value of its water for irrigation in an arid land and its tremendous potentialities in the development of hydroelectric power.

In the Colorado River Basin are some 120,000,000 acres of arid land, (Fig. 1), land with precipitation averaging less than 10 inches a year. Over thousands of square miles the rainfall averages less than 5 inches a year. For the entire basin the average depth of run-off is less than an inch and a half a year. The flow of the stream varies greatly from season to season. The annual discharge, as measured at Yuma, has ranged from ten to twenty-six million acre-feet in the last 26 years. The maximum flow normally comes in June with discharges occasionally reaching 200,000 second-feet. Not infrequently the late summer flow is barely sufficient to meet present irrigation demands.

For a thousand miles through its vast desert empire the river flows at the bottom of mighty canyons, as useless to the thirsty land as one of its own mirages. Only in the river valleys through which tributaries flow to join the main stream are irrigable areas. Along the lower river, after it has emerged from the deep canyons, are other areas that may be irrigated to advantage. Of the 120,000,000 acres of arid land in the Colorado River Basin there are perhaps 10,000,000 acres which might be classed as irrigable.

In the early days the chief problem of the Colorado was one of transportation, getting the wagon trains across. As river traffic developed low water and shifting sand bars tried the souls of steamboat men. Bigger problems appeared with the development of the Imperial Valley. Early in the sixties an Army engineer had seen

the great possibilities of the Salton Sink, a waterless desert, and the near-by Colorado. More than a million acres of land lay below the river level. Old overflow channels offered canals almost ready-made. In 1902 the engineer's vision became a reality. Water flowed down the old Alamo River Channel and into the canals of the newly named Imperial Valley. Development was rapid. Cities sprang into being. Then came the break. The whole river left its old course and flowed into the valley, flowed unchecked for more than a year. The closing of that break was a great achievement. But ever since there has been the threat of another break, a break that might be even harder to close.

The lowest stages of the river normally come in the late summer while the demand for irrigation water is still heavy. More than once water shortage at this time has threatened disaster to the crops.

We hear much of the tremendous fertilizing value of silt left by the Nile. The Colorado River mud is not looked upon as a blessing. It is estimated that 22,000,000 cubic yards of silt enter the canals of the Imperial Irrigation District annually. Quite a proportion of this is deposited in the canals and ditches and must be removed. The annual bill for this removal is close to a million and a half dollars.

The only easy way to run water from the Colorado River to the Imperial Valley is through Mexico. When development of the Imperial Valley began permission was secured from the Mexican Government to run it through Mexico, at a price. Mexican lands were, at any time, to be entitled to one-half the flow of the canal. At seasons of low water the Imperial Valley has been ill able to spare one-half of its supply. To meet this situation and other disadvantages that have developed in running the water through a foreign country demand has grown for an all-United States canal.

These problems of the Imperial Valley, especially that of flood threat, have appealed strongly to the imagination of the people of the United States. Following the closing of the 1905 break Congress appropriated a million dollars to build levees that should prevent the recurrence of such a disaster. Surveys of the river showed that at several places along the middle course there were dam sites offering almost unlimited facilities for storage, storage that could guarantee flood control. Under congressional authorization the Bureau of Reclamation took up the problem of locating and studying the site which would best serve the purpose.

At that time the problems of the Colorado River seemed to be essentially the problems of the Imperial Valley. In 1920 legislation was introduced into Congress providing for the building of a great dam at or near Boulder Canyon, the site chosen by the Bureau of Reclamation, which should end the problems of flood, drought and silt for the Imperial Valley. An all-United States canal was also provided for. A huge power plant at the dam was to repay the Government the entire cost of the project.

According to the prevailing law over the West right to water in streams may be established by filing claim and putting the water to use. Such rights are not affected by State lines, are fundamental on a stream. Establishing the right referred especially to municipal use or for irrigation. Use for power development might be recognized also.

Very determined opposition to the building of a great dam at Boulder Canyon came from the upper-basin States. In 1920 these States had more than a million acres of land under irrigation. It was considered feasible

to put water on 2,000,000 acres more, but this added development was not immediately practicable. It was feared that the building of Boulder Canyon dam would permit the establishing of water rights in the lower basin which might leave an insufficient supply for the upper basin in the years to come. Since the water originated in these States they felt that they had a peculiar right to all that was needed for their lands.

The claim of the upper-basin States was plausible. They were able to block action on the dam. Their opposition could be overcome only by guaranteeing that the construction of the dam would not deprive them of their water supply. Such guaranty could be given only by agreement of all the States in the Colorado River Basin. To meet this situation Congress authorized the calling of a conference of the seven States interested which should allocate to each State its rights in the flow of the river. The meeting was held at Santa Fe, N. Mex., in the summer of 1921. All of the States were represented. Every claim of the upper-basin States was recognized. Attempts to allocate water to the individual States failed. An average flow of 7,500,000 acre-feet a year was allowed to the lower basin. Permission to construct the Boulder Canyon Dam was included in the agreement.

The legislatures of six of the seven States ratified the so-called seven-State compact almost at once. After a bitter fight Arizona's Legislature, by one vote, failed to ratify. For this failure to ratify Arizona has been severely criticized. But she was logical enough. She asked simply what the upper States had asked, and been given; protection in her rights. Millions of acres of Arizona's lands lay only waiting water to become fruitful. As in the upper basin, development was not immediately practicable. California had already filed on an amount of water equal to *all* that had been allotted to the lower basin. Irrigation in Mexico, from the Colorado River, was increasing and, by use, establishing right to water. Power development along the Colorado River had long been considered one of Arizona's greatest assets. Ratification of the seven-State compact carried consent to the construction of Boulder Canyon Dam. Plans for this dam provided for great power development. In this development Arizona was given no right. Acceptance of the compact would leave Arizona shorn of both water and power rights. It is only fair to the other States to say that Arizona went to the seven-State conference poorly prepared to ask for water rights. She had been a State only nine years. She did not know her own needs and was in no position to impress these needs on others. Questions of power rights were not within the scope of the conference.

Arizona's stand appears to have been justified. The principle of her demand for water rights similar to those granted the upper-basin States has been recognized, but no division of water with California has been agreed upon. All the basin States have united in asking for a treaty agreement with Mexico limiting the water right which may be established there. All the basin States, except California, agree on the right of a State to realize revenue from water-power development such as is planned at Boulder Canyon.

The foregoing facts are the background for the present situation in Colorado River development.

There are to-day certain pressing problems in connection with the Colorado River that call for early solution. One of them is southern California's need for an increased water supply. Nature gave southern California a climate of peculiar appeal. Many people have gone there to

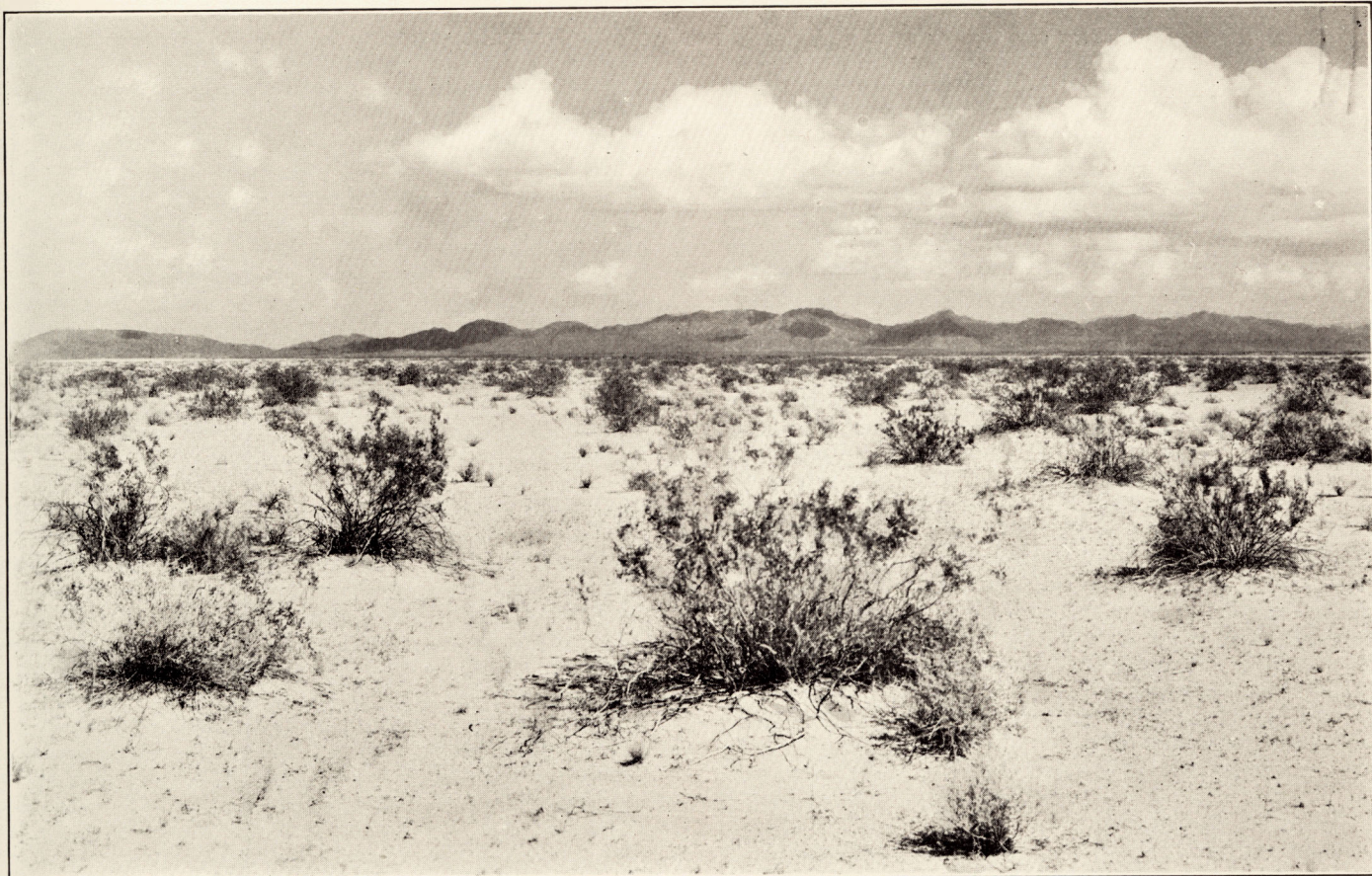


FIG. 1.—Typical of millions of acres of desert land in the Colorado River Basin needing only water to become fruitful

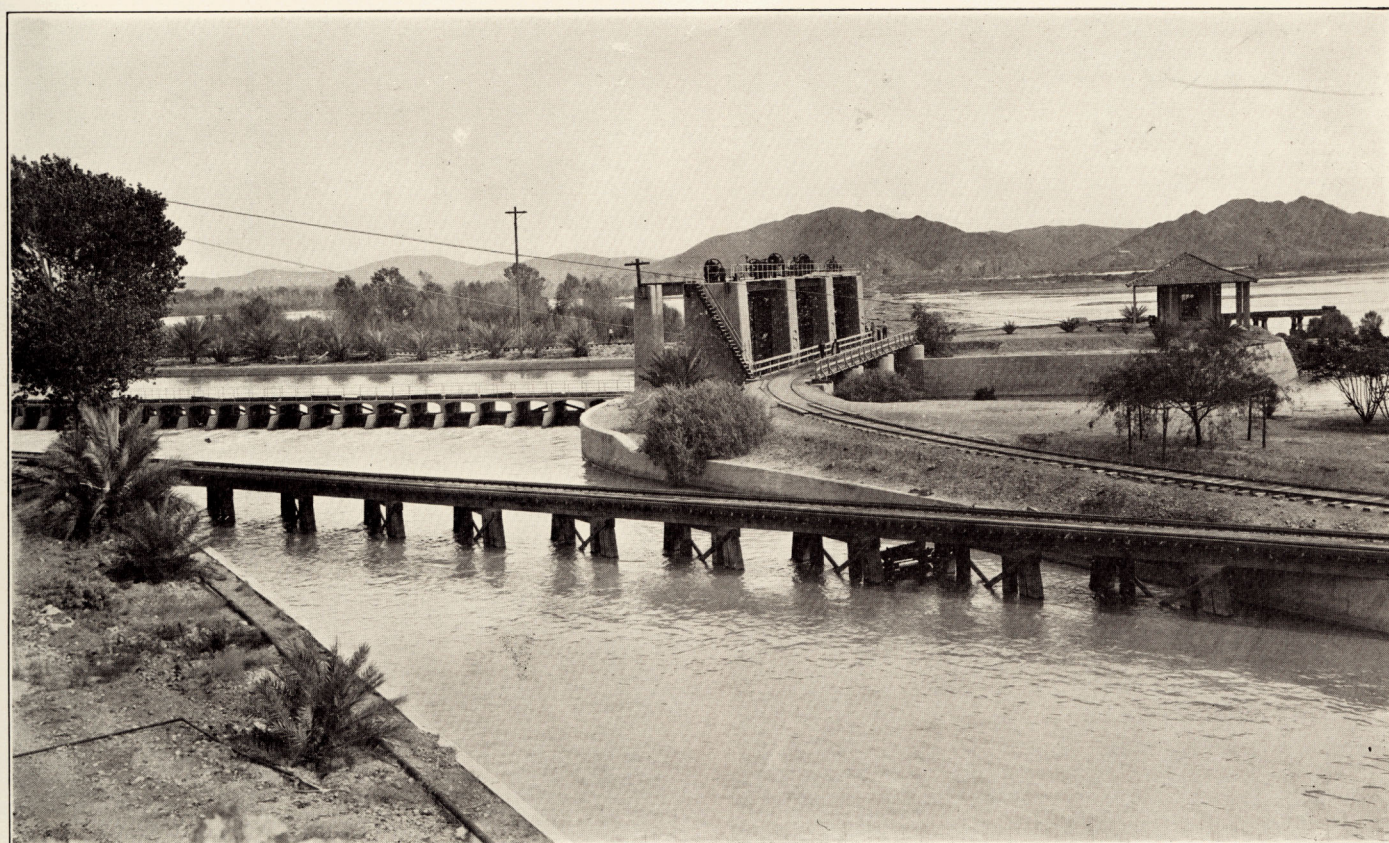


FIG. 2.—Canal intake from desilting basin at Laguna Dam. Huge gates near the center of the view are raised every few days to sluice out accumulated silt in the basin

live because of it. Partly because of the climate, partly to keep pace with growing population, partly because of the discovery of great oil fields, partly because of rich tributary hinterlands, great industrial growth has come also. The climate has had a great part in southern California's growth. The climate, the great number of sunny days and the small number of rainy ones, set a limit on that growth. The problem of water supply is becoming serious. It is not yet serious in years of even normal precipitation but records of the past show series of years with decidedly subnormal precipitation. A repetition of such a period as that extending from 1895 to 1901 could hardly help but bring on a very serious water shortage. Ten years from now with increased demand from growing population and industry it would be more serious. In 30 or 40 years it might well mean a disaster of major proportions with losses running into a great many millions of dollars.

Further development of present sources of supply is possible but decidedly limited. Generally speaking southern California's present water supply, including that drawn from Owens River, is controlled by the same climatic conditions. A drought, when it comes, is likely to affect all sources of supply. Not only is there need of augmenting the present supply but it should be augmented if possible from a source not affected by southern California's droughts. The Colorado River, with the adequate storage offered by her dam sites, is about the only source to which southern California can turn. These same dam sites present opportunity for developing the tremendous amount of power that will be needed to lift 1,000,000,000 gallons of water a day over the intervening mountain range. Engineer's estimates call for some 400,000 horsepower to do the job. California has provided for the formation of a great water district of municipalities to handle the project. Cities as far south as San Diego and as far north as Santa Barbara could be served. It seems likely that the proposed system, including distribution to the various cities, will cost fully \$300,000,000.

Plans have been offered for a system that would deliver water over the divide without pumping, using an intake far up the river, but the cost of such a project, as well as the engineering difficulties involved, are very great. The plan tentatively accepted calls for an intake near Blythe, approximately the nearest point on the river to Los Angeles. The climb to Shaver's Summit, near the head of the Coachella Valley, would be made in five lifts, aggregating about 1,400 feet, distributed along the first 75 miles of the route. Fifty to sixty miles of tunnel will be required. The first unit proposed would handle 300 second-feet of water—more than the Owens River Aqueduct is now supplying Los Angeles.

The combined filings of Los Angeles and San Diego on the Colorado River are 1,655 second-feet, which would mean 1,206,000 acre-feet a year. It will be a good many years before the cities of southern California can use as much water as that. If the estimates which the writer has seen are correct, the cost of delivering water over the divide, it will be decidedly practicable to use some of the water for irrigating purposes. There are rich orchard sections in southern California where the level of the water table has been dropping lower and lower. Demand exceeds the supply. It seems that an outside source of water must be depended upon to maintain even present development. It is almost, if not quite, as important to assure an adequate water supply for agriculture as for municipal use.

Imperial Valley has been facing the flood menace every year since 1906, has faced it bravely and won out. With improved equipment and increased knowledge of the problems to be met it is probable that the Imperial Valley could win out for many years to come. But no one knows. A flood in the Colorado as unprecedented as that in the Mississippi last summer might well be more than the valley's fortifications could resist. It probably is not necessary to explain that the consequences of a great break in the defences of the Imperial Valley is much more serious than a similar breach in the levees along the Mississippi River. The Imperial Valley occupies the southern half of a great basin or sink 90 miles long and from 10 to 40 miles wide. The bottom of the basin is 300 feet below river level and there is no outlet save over the top. Water escaping onto the lands along the Mississippi River drains off in the course of a few weeks. Water escaping into this great basin stays there until the sun dries it up. If the break could not be closed the basin would gradually fill up. It would make a very beautiful inland sea, quite impressive in the desert setting, but it would blot out half a million acres of rich farms and ten or a dozen pleasant, thriving towns. Because the grade toward the bottom of the basin is much steeper than the grade toward the sea, because the deep silt of the valley floor makes canyon digging easy and dam building very difficult the closing of a big break would present very grave problems. As to the need of a dam in the river which will guarantee that there shall be no such break there is no question.

You can fight a flood but you can not fight a drought. Hardly less important than flood protection for the Imperial Valley is protection against water shortage. The late summer flow of the river has several times dropped close to the danger point in water supply. In the second week of September, 1924, the supply of water reaching the Imperial Valley was insufficient even to water stock. Losses were heavy. Banks and business houses as well as farmers faced almost a wiping out of their resources. Rains in northern Arizona and Utah brought relief in the nick of time. The Imperial Valley has no wells, practically speaking. Failure of water supply from the Colorado means absolute drought to the valley, save in the one small area where well drilling has been successful. Protection against water shortage is very essential.

Mention has been made of the valley's silt problem and the annual bill of a million and half dollars for its removal. From the canals and ditches. Ten years ago the Imperial irrigation district bought the right to take its water supply from Laguna Dam, 12 miles above Yuma. This is a diverting dam only and provides no storage, but it does provide a settling basin where the slow-moving water deposits a great proportion of its load of silt. (Fig. 2.) Water for the canals is "skimmed"; that is, drawn off the top of the basin, and, while still muddy looking, is much freer from canal and ditch-clogging material than water drawn directly from the river. The right of the Imperial irrigation district to take water from Laguna Dam has never been exercised, probably because the necessary changes at the dam and in the canal system would cost nearly \$8,000,000.

There are disadvantages in the present arrangement for running the valley's water supply through Mexico. Having to share the water with Mexican lands is one. Another is in regard to water rights. Since the water, though taken from the river on the United States side of the border, goes into Mexico and is there divided with Mexican lands the water rights of the Imperial Valley

can have little or no standing in the courts of the United States. The water passes out of their jurisdiction. In the Imperial Valley and in the Coachella Valley, occupying the northern part of the Salton Sink, are some 270,000 acres of good land out of reach of the present canal system. A canal starting at Laguna Dam and following a higher grade could reach this land. The proposed All-United States canal would take care of these problems as well as that of silt. It is only a question of whether the benefits would justify the estimated cost of \$41,000,000. Between the Colorado River and the Imperial Valley, in the United States, lies the great sand-hill area 40 miles long and 6 miles wide. The course of the All-United States canal, as surveyed, lies for 10 miles through the sand hills. All this distance it must be in a deep cut with maximum depth of 150 feet. When it is remembered that the width of the canal at the bottom will be 140 feet and that the banks, to hold in the soft sand, must slope back very gently one may get an idea of the immensity of the excavation required. An alternate route holding the grade of the All-United States canal could be built around the southern end of the sand hills by swinging 2 or 3 miles into Mexico. This route offers a saving in construction costs that is very material. It seems that it should be possible to work out some treaty arrangement with Mexico whereby the necessary strip of land could be secured. If a dam is built on the Colorado the United States would be in a position to guarantee a water supply for Mexican lands in exchange for concessions as to canal route. It should be possible also to put the water rights of the Imperial Valley in the position where they have the needed legal standing.

These are California's needs: Water for the cities of the coastal section of southern California; flood protection, drought protection, silt relief, and a new canal line-up for the Imperial Valley. The legislation taken up at the last session of Congress and passed by the House was written to meet these needs. It should meet them. Provision was made that the Government investment should be repaid by revenue from the sale of power. This repayment would be guaranteed by actual contracts in the hands of the Secretary of the Interior before construction began, repayment with interest within 50 years. Southern California municipalities and industries must take the power. There is no other considerable market. Eventually some two-thirds of the power will be needed to pump water over the divide, but it probably will be a good many years before that requirement reaches a peak, and other power dams may be ready to share the load. In effect southern California underwrites the cost of the project. Putting the power to profitable use is her problem.

Other needs of the lower basin are not so pressing as those just mentioned. Nevada can use little water. Arizona, on the other hand, has millions of acres of land to which water might conceivably be applied. The Grand Canyon of the Colorado is cut through a great plateau which forms the northern part of Arizona. Much of the central and southwestern portions of the State lie below the level of the river in the Grand Canyon. A tunnel driven under the plateau to tap the river at any one of several dam sites could bring water to nearly 4,000,000 acres of land. But the tunnel must be 80 or more miles long. The cost would be very great. It is not a feasible undertaking at the present time. No one can say that it may not be practicable at some time in the future. Another plan, on a less gigantic scale but involving considerable pump lift, would bring under irrigation

more than a million acres of land in southwestern Arizona. It is doubtful whether land values justify this project at the present time but its practicability seems assured.

California's attempts to solve her problems in the Colorado River have brought her into conflict with Arizona and to a lesser extent with most of the other States of the basin. But it has been chiefly Arizona that has blocked action in Congress. Why? It is not that Arizona opposes flood protection for the Imperial Valley. It is not because she wishes that section to feel the pinch of drought. It is not because she begrudges Los Angeles and her sister cities a water supply. Granting California's needs and rights, Arizona asks equal consideration for her own. The allocation of water to the lower basin was not great enough to meet the estimated needs of both States. The original claims of both States have been modified. Both have made concessions. But California has set a figure below which she will not go and Arizona has set a minimum amount which she must have. The sum of the two minimum figures is 600,000 acre-feet a year more than the two States have to divide. Six hundred thousand acre-feet a year is enough water to turn more than 150,000 acres of desert into rich farms, enough to create wealth of from thirty to fifty million dollars for the State that has it. It is not a thing to be lightly given up.

One-half the proposed Boulder Canyon Dam will be in Arizona, one-half in Nevada. The two States ask for a revenue from power development equal to what they would receive if it were a private enterprise. California receives revenue from power development within her borders. New York State taxes the power development at Niagara Falls. It seems reasonable enough for Nevada and Arizona to ask for the same right. California, naturally enough, has opposed recognition of the right. Her power users, municipalities, and corporations would have to pay the tax. An amendment to the bill before the Senate, adopted near the close of the last session of Congress, provides that 37½ per cent of the profits of operating the power plant at the dam should be divided equally between Nevada and Arizona. It seems unlikely that there will be any profits during the 50 years that the dam is being paid for. The States might reasonably wait 50 years if there was assurance of a reasonable revenue after that time. At least the amendment is a recognition from the Senate of the reasonableness of the claims of Arizona and Nevada for a return from such a development as will be made at Boulder Canyon. Arizona is fighting not only for this case but for a precedent which shall govern in the development of 4,500,000 horsepower of hydroelectric energy that may be made along and within her borders.

A review of the progress made toward development of the Colorado River since 1920 is not very encouraging. Legislation before Congress is much the same as that introduced eight years ago. The truly vital needs of the Imperial Valley have not been met. The later recognized but just as vital needs of the coastal section of southern California have not been satisfied. The seven-State compact has not been ratified. There is little prospect that it will be ratified, without change. The program of river development adopted eight years ago has failed utterly to get results.

Does it seem unreasonable to suggest that a fresh start be made? A decided sentiment has developed opposing the fundamental principle of the seven-State compact, favoring a retention of the old law that water rights must be used to be retained. There is very good ground for ob-

jecting to the allocation of water to a State or section in perpetuity, regardless of use. Such water must waste until put to use by the section to which it is allocated. Such a waste extending over many years may well represent a very great economic loss to the Nation. Such an allocation as was made under the seven-State compact is contrary to the fundamental law of supply and demand. It is as indefensible as price fixing. It arbitrarily sets a limit on the growth of one section of the country in order that, at some time, if conditions are right, another section may develop. Is it not possible that a compromise between the old water-rights law and the new allocation idea may be worked out? Use should, of course, establish right to allocated water. Every 10 years, or perhaps at longer intervals, water to which right had not been established could be reallocated on the basis of need. Such a plan would fit in with the economic growth of the Nation. It would be flexible where the old plan is inflexible.

This would require a new seven-State compact. In the seven years since the old compact was drawn up much has been added to our knowledge of the river and its problems. Probably every one of the seven States of the Colorado River Basin could act more intelligently now. It seems that a new conference should be called and a new compact drawn in the light of our increased knowledge. Not only that, but provision should be made for a permanent body, made up of representatives of the States, to meet as need arose and act upon problems of river development. Arizona's fight for water rights should not properly be directed at California. California should not be asked to deny herself needed water to supply Arizona. The needs of Arizona should be met by a fair division of the flow of the whole river. The 600,000 acre-feet of water in dispute between California and Arizona could be far better spared from the abundance of the upper-basin States than by either one of the contesting States. At least it seems that a new seven-State conference should be able to work out a more equitable division of the water. On the surface it appears that there is not water enough in the river to meet the demands that will be made on it, in the course of time. Many irrigation engineers, however, maintain that with the return flow from irrigated lands it will be sufficient to meet all demands. Time only can settle this question. This and other problems must come up for settlement as development of the river proceeds.

A few words on the proposed first step in Colorado River development seem in order. This would be the construction of a great dam at or near Boulder Canyon. The site is in a canyon 2,000 feet deep. At low-water level the width is less than 200 feet. To reach bed rock for foundations excavation at least 130 feet deep will be necessary. The dam itself, from foundation to parapet, is to be nearly 700 feet high, more than an eighth of a mile. The height above stream bed will be 550 feet, 200 feet higher than any dam now constructed. The capacity of the great basin behind the dam will be seven or eight times that of any present storage reservoir. The Colorado River brings down more than a hundred thousand acre-feet of silt a year. This will settle in the calm waters of the great lake above the dam. This deposit of silt piling up for a hundred years will not materially affect the storage and power value of the dam. Admittedly the stresses, strains, and pressures involved in such a mighty structure are beyond present experience. A

commission of eminent engineers and geologists has been appointed, with the approval of the President, to study problems in connection with the proposed dam this summer. The result of the findings of this commission will be of very great interest to all who are concerned in the development of the Colorado River.

Arizona has opposed a good many things in the last seven years. The great dam proposed for Boulder Canyon is one of them. She has within her borders a splendid object lesson in the maximum utilization of a stream for power development as well as for irrigation. The Roosevelt Dam, at the junction of the Salt River and Tonto Creek, furnishes the principal storage. Three power and substorage dams have been built and a fourth soon will be started to utilize nearly every foot of the fall between the base of Roosevelt Dam and the level of the Salt River Valley. It is a paying proposition. It looks to the people of Arizona as though some similar plan could and ought to be worked out for the Colorado with a water supply and drop more than ten times as great. The Boulder Canyon Dam site is near the foot of the drop. Its tremendous storage will be no help to power development on most of the river. When dams are built farther upstream, as they will be, much of the storage provided for at Boulder Canyon will become useless. Storage should come at the head of the slope. Substorage dams and power plants should be built as near the market as possible.

To fit in with a comprehensive plan for the utmost use of the river it seems that the dam at Boulder Canyon should be a substorage dam. This would mean a smaller dam, but a structure 100 feet lower would provide all reasonable flood protection, would assure adequate water supply, and permit power development enough to meet essential demands for many years to come. As dams were built above, power development at Boulder Canyon would increase and flow regulation could be more perfect. As demand justified, other power dams could be built, a series of steps, all using the regulated flow from storage at the head of the slope. Certain engineers of high standing urge the construction of two dams near the head of the slope, one at Flaming Gorge and the other at the Dewey Dam site, as the first step toward development of the river. These dams are said to offer no great problems of construction and would not only supply a considerable storage at the head of the slope for power development, but would very greatly simplify the problem of building a dam at Boulder Canyon by giving at least a partial control of the river.

This is the Colorado River situation as it appears to one who has tried to see it not as a citizen of California or Arizona but as a citizen of the United States. It seems that there should be a plan worked out for the river's development and use, worked out by the finest engineers the United States can boast. One can hardly help a thrill over the rich irrigated lands of the Imperial or Salt River or Yuma Valleys, reclaimed from the desert. We hope to see these areas grow mightily. We hope to see the tremendous power of a river that carved out the Grand Canyon and carried hundreds of cubic miles of earth and sand and rock from the mountains to the sea turned to man's account. It can be done. We may start it. We would like to think that men, in the years to come, will believe that we started it wisely.